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ABSTRACT

A study was conducted to verify Karttunen's (1973) theoretical linguistic distinction between verbs that function as "plugs" and those that function as "holes." Plugs are defined as performative verbs that block off a sentence's presuppositions so that they are not necessarily part of the speaker's own beliefs. Holes, on the other hand, are those verbs for which the presuppositions of the sentence necessarily form part of the speaker's beliefs. Adult native English speakers and adults learning English as a second language were administered a questionnaire with sentences containing plugs or holes. The subject's task was to judge for each sentence what the speaker of the sentence necessarily had to believe with respect to the presupposed information contained in the sentence. The results indicate that for both groups, the theoretical distinction between plugs and holes was not real. Both groups treated all the verbs as if they belonged to the category of holes. (Author/RW)

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ON PRESUPPOSITION AND SPEAKER–BELIEFS: EMPIRICAL INVESTIGATION OF THE THEORETICAL DISTINCTION BETWEEN "PLUGS" AND "HOLES"

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ABSTRACT

This paper reports the findings of a study designed to test Karttunen's (1973) theoretical linguistic distinction between "plugs" and "holes." A basic assumption was that if this distinction is psychologically real for members of the English speech community, it ought to be empirically verifiable. The investigators were also interested in the question of how non-native speakers of English, as compared with native speakers, behave with respect to the plug-hole distinction. Two groups of subjects were tested–adult native speakers of English and adults acquiring English as a second language. Subjects were presented with a questionnaire which consisted of three sentences containing holes. The subjects' task was to judge for each sentence what the speaker of the sentence necessarily had to believe with respect to the presupposed information contained in the sentence. Results indicate that, for both groups of subjects, the theoretical distinction between plugs and holes was not real; both groups treated all the verbs as if they belonged to the category of holes.

Although much has been written by philosophers, logicians and linguists about presupposition, it nonetheless remains a rather unclear and controversial issue. Many different phenomena have been discussed under the heading of "presupposition," and the term "presupposition" has been defined from a number of different points of view.

In its formal logical and semantic sense, it has traditionally been defined as the unstated but necessary preconditions for the truth or falsity of a proposition. Logicians and semanticists, by defining pre-

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supposition in terms of logical entailment, consider the truth of a presupposition a necessary condition for the sentence to have a determinate truth value (Strawson 1952, Van Fraasen 1968, Austin 1962). Karttunen summarizes this position as follows: "P presupposes Q just in case that Q is true whenever P has a truth value." (1971b:3)

On the other hand, linguists who have adopted a pragmatic as opposed to a formal logical approach to presupposition use the term to refer to the unstated and necessary beliefs and assumptions of the speaker underlying a proposition (Hutchinson 1971, Karttunen 1974 and 1975). In this sense, presuppositions are not defined in terms of truth conditions, but are regarded as sincerity conditions for the utterance of a sentence. "Whenever A is uttered sincerely, the speaker of A presupposes B (i.e. assumes B and believes that his audience believes B as well)." (Karttunen 1973:169)

Karttunen (1973) argues that there is actually little, if any, conflict between the semantic and the pragmatic concept of presupposition. Consider, for example, the following:

(1) The King of France is going to Germany tomorrow

(2) Harry's wife complains a lot

Regardless of whether one adopts the semantic concept of presupposition or whether one goes along with the pragmatic notion, these utterances or the speakers of these utterances presuppose that there is a King of France and Harry has a wife, respectively. This particular type of presupposition has been called "existential presupposition." The prevalent test for presupposition is ordinarily the negation of a proposition; the presuppositions of a declarative utterance remain constant under negation. If A presupposes B, the A must still presuppose B, otherwise one is not dealing with a presuppostion. The existential presupposition, for instance, of

(3a) Jack's children are clever

namely that Jack has children, is not affected by the negation of the proposition. The negative

(3b) Jack's children are not clever

still presupposes that Jack has children. In the case of a failure of a presupposition, e.g. in the preceding if Jack does not have any children, linguists following the semantic notion of presupposition maintain that no truth value can be assigned to (3a) and (3b). According to the pragmatic view, failure of presupposition results in the insincere or infelicitous utterances. It is not within the scope of this paper to resolve the areas of debate that do exist between the semantic and pragmatic notions of presupposition. In fact, rather than providing support for one of these views over the other, the research reported in this paper, which is independent of the particular approach to presupposition one chooses, poses problems for either view in the empirical data we present on certain English constructions. Nothing reported herein relies on adopting one or the other of these views of presupposition, and we shall use the term loosely and interchangeably to apply to either.

Simple utterances (i.e. sentences which consist of only one main clause) do not seem to constitute a problem with respect to deriving the presuppositions involved. However, the question arises of how one can determine the presuppositions of a complex sentence in relation to the presuppositions of the clauses it contains. Does, for example, the sentence

(4) John told Karen that the King of France is going to Germany tomorrow

as a whole still presuppose that there exists a King of France? Must the speaker of this sentence necessarily commit himself to the truth of the underlying assumption of the complement sentence?

Langendoen and Savin (1971) have dealt with this question, which they refer to as the "projection problem," by attempting to

show that the presuppositions of a complex sentence equal the sum of the presuppositions of its component parts. However, Morgan (1969), who refers to the projection problem as the "cumulative hypothesis," and Karttunen (1973) have pointed out that the Langendoen-Savin hypothesis, in many instances, leads to wrong predictions. It seems obvious, for example, that the speaker uttering

(5) Bill said that the King of France is going to Germany tomorrow

does not necessarily have to commit himself to Bill's false beliefs that there exists a King of France.

In addition to negation, cancellability is another way of testing for presuppositions. Most linguists have accepted the view that under normal circumstances presuppositions are not cancellable. However, a situation where the presupposition contained in the complement sentence of (5) above can be cancelled by the speaker is easily imaginable. The speaker of (5) could, for example, add: "Can you imagine that?! I thought everybody knew that France doesn't have a King!" If presuppositions are uncancellable, how then is it possible that (1) presupposes that there exists a King of France whereas (5) carries no such presupposition?

It seems that, when utterances involve the speaker's report of a third person's illocutionary act, the presuppositions of the complements of certain complex sentences reflect the speaker's own beliefs or presuppositions, whereas for certain other complex sentences the presuppositions of the complement may or may not be shared by the speaker, i.e. may or may not be presuppositions of the whole sentence in which the complement is embedded. These observations led Karttunen (1973) to the hypothesis that the cumulative principle–although basically correct–had to be modified by certain filtering and blocking conditions. Concluding that a cumulative principle would have to be able to account for the above mentioned phenomena, he proposed a bottom-to-top theory of what he calls "plugs," "holes," and "filters" (1973)[1]

Predicates said to function as plugs are verbs of saying or "performatives" (Austin 1962) that can be used to report on what illocutionary act has been performed. Karttunen claims that, if a complex sentence contains as its higher verb a plug, all presuppositions of the complement sentence are blocked off and are, therefore, not necessarily part of the speaker's own beliefs. Karttunen maintains, for example, that the sentence

(6) Cecilia asked Fred to kiss her again

does not presuppose that Fred had kissed Cecilia before (1973:174). As Karttunen notes, however, all the plugs are "leaky" if the grammatical subject of the main clause coincides with the speaker uttering the sentence, i.e. if the sentence is used performatively. Thus, when uttering the sentence

(7) I ask you to kiss Zelda again

the speaker must necessarily believe that the addressee has kissed Zelda before. This exception notwithstanding, Karttunen maintains for all other cases that the speaker reporting an illocutionary act performed by someone else does not commit himself to the truth of the underlying proposition of the complement sentence. (Karttunen 1973:175)

Holes, on the other hand, according to Karttunen, are those predicates for which Langendoen and Savin's hypothesis works, i.e. the presuppositions of the complement become presuppositions of the matrix sentence and thus constitute part of the speaker's necessary beliefs. "If the main verb of the sentence is a hole then the sentence contains all the presuppositions of the complement clause embedded in it." (Karttunen 1973:176) According to Karttunen, the class of holes includes Kiparsky's (1970) factive verbs, as well as Newmeyer's (1969) aspectual verbs and Karttunen's (1971a) implicatives. Thus, uttering the sentence

(8) Fred regretted that he kissed Zelda again

commits the speaker to believe in the truth of the entire underlying proposition, i.e. to the belief that Fred kissed Zelda before.

Although there have been empirical investigations of Kiparsky's predictions concerning the so-called factive verbs (Gordon 1975, Rosenbaum 1975), and also Carrell and Crozat (1979) on IF-verbs, to our knowledge no studies have been conducted on Karttunen's cumulative principle on the theory of plugs, holes, and filters. The present study set out to empirically test the theoretical linguistic distinction is a valid part of the description of the English language, it should be detectable in the linguistic behavior of adult native speakers, as well as be evidenced in the acquisition process of non-native adults learning English as their second language. One verb from each class was chosen from Karttunen's list of plugs and holes, and appropriate complex sentences well constructed with the verbs in question as the main predicates of the higher matrix clause. The subjects' task in the study involved judging the complex sentences in terms of necessary speaker-beliefs. The study assumes that, for each group of subjects, it should be possible to measure differences in the judgments of sentences as a function of the hypothesized differences between plugs and holes. If Karttunen's theory about the distinction between plugs and holes is empirically valid, subjects should detect differences in speaker-beliefs or presuppositions in sentences with plugs, on the one hand, and sentences with holes, on the other. Subjects' judgments about speaker-beliefs should differ significantly, depending on whether the sentence contains a matrix verb which is a plug or a hole.

METHOD

SUBJECTS. Twenty-three adult native speakers of English enrolled in an elementary grammar course for freshmen and twenty-one adult non-native speakers were tested in this experiment. Seven of the L2 subjects were students attending intensive English classes at the Center for English as a Second Language (CESL) at SIU-C. The remaining fourteen L2 subjects were enrolled in a writing course designed to teach technical expository writing to foreign students. Since there were no differences perceived in the performance of the two sub-groups of L2

subjects, they will be treated as one group in the reporting and discussion of the results.

PROCEDURE. The subjects were presented with a written questionnaire consisting of six utterances, each one followed by a set of three multiple choice responses (a, b, and c). The utterances were complex sentences of the form: main (higher) clause + complement sentence.[3] Three of the test items contained a plug in the main clause; the other three sentences employed a hole as their higher verb. One verb of each class was chosen from Karttunen's list: the plug was the verb PROMISE, the holes the verb BE POSSIBLE.

Since presuppositions are said to hold under the negation, each verb was used in its negated form (neg 1), as well as affirmatively. Moreover, a second type of negation (henceforth called neg 2) was used which, instead of negating the higher verb (plug or hole), involved the negation of the proposition of the complement clause. Thus, there were three sentences for each verb, two of which involved a type of negation.

In order to partially control for possible alternative explanations concerning the expected differences between plugs and holes, the type of presupposition tested for was held constant for each lexical item, i.e. all sentences containing PROMISE and POSSIBLE involved existential presupposition. Furthermore, to test the "strength" of holes, the complement sentences of the test items with POSSIBLE contained presuppositons counterfactual to the real world. Also, although not using the same lexical items (the higher verb excepted, of course), all three sentences for each verb were made as similar in structure and content as possible. All utterances were enclosed in quotation marks to prevent subjects from identifying with the grammatical subject of the sentence and to indicate instead that the sentence was to be viewed as though it had been uttered by some other speaker, X (i.e. not by the subjects themselves). The subjects' task was to focus on the speaker and to make a judgment about the speaker's necessary beliefs concerning the presupposed information contained in the sentence. Subjects were told that speaker X was saying

the sentences as sincere utterances and that he could be holding beliefs contrary to their knowledge of the real world. Further, subjects were asked to view themselves in the position of the hearer and to then judge from the sentence what speaker X necessarily had to believe. To indicate to subjects the importance of "necessarily," the word was underlined whenever it appeared in the questionnaire. (The entire questionnaire, including the instructions to subjects, is given in the Appendix.)

The first of the three responses from which the subjects were asked to choose, (a), stated that the speaker necessarily had to believe in the truth of the complement sentence; the second response, (b), stated the opposite, namely that the speaker necessarily had to believe in the falsity of the complement sentence; the third choice, (c), suggested that the speaker had not necessarily committed himself to the truth of the complement sentence.[4] Thus, according to Karttunen's theory, the predicted response for all sentences containing plugs was (c), whereas the predicted response for all sentences containing holes was (a).

An example containing a plug was given prior to the actual test, which attempted to illustrate that speaker X could possibly report on an illocutionary act without necessarily sharing its assumptions.

If Karttunen's theory of the difference between plugs and holes is empirically valid, we would expect subjects to perform equally well with both types of sentences, clearly choosing the (c) responses for the plug items on the questionnaire and the (a) responses for the hole items. Subjects' scores on the predicted responses should be equally high on both types of items, which would indicate that the subjects' judgments about speaker presuppositions differ significantly, depending on whether the sentence contains a plug or a hole.

RESULTS

The scoring procedures were as follows: one point was given on each item for which the predicted response was selected--zero points were given if either of the other two choices were selected. Table 1

contains the raw data of the results for each group.

Native Speakers (N=23)

Plug	Affirmative	Negative-1	Negative-2	Total
*PROMISE	9 39%	6 26%	4 17%	19 27%
Hole				
**POSSIBLE	16 70%	14 61%	11 48%	41 60%

Non-native Speakers (N=21)

Plug	Affirmative	Negative-1	Negative-2	Total
*PROMISE	7 33%	8 38%	5 24%	20 32%
Hole				
**POSSIBLE	10 48%	9 43%	12 57%	31 49%

* predicted response (c)
**predicted response (a)

Table 1
Predicted Responses - Raw Scores & Percentages

The raw data contained in Table 1 strongly indicate that both groups of subjects did not make Karttunen's predicted judgments about sentences containing plugs. For both groups, performance was low on plug items but relatively higher on hole items. All of the plug items received substantially less than half of the possible total of correct

responses. For the L1 subjects, the totals on the hole items were more than twice as high as for the plug items; for the L2 subjects, the obtained total scores on plug items were only two-thirds as high as the figures for the hole items. The raw scores also seem to reflect minor effects of negation; scores on both verbs for both groups of subjects were lower on most Neg-1 and Neg-2 items than on the corresponding affirmative items.

Although raw scores are valuable for giving a first indication of the outcome of an experiment, they are insufficient for any reliable conclusions to be based on them. Hence, let us turn our attention to comparing the percentage scores in Table 1. To determine whether the obtained percentage scores could have been due to guessing on the part of the subjects, our first comparisons are of the obtained percentages to "random-chance" percentages via the test of significant differences in proportions for independent samples. Because there were three response alternatives to each test item, the random-chance percentage in every case is 33%.

As can be seen in Table 2, the only score which differs significantly from random-chance is the native speaker group in their performance on the hole items. In the case of the performance of the native speakers on the plug items and in the case of the non-native speakers in their performance on both the plug and the hole items, we cannot rule out random guessing. However, it is interesting to note that the non-native speakers' performance on the hole items begins to approach statistical significance, indicating that their performance on these holes may be better than chance guessing at the correct response.

Native Speaker (N=23)

Plugs	Obtained Percentage	27%	$z = .77$ n.s.
	Random Percentage	33%	
Holes	Obtained Percentage	60%	$z = 3.18$ $p < .01$
	Random Percentage	33%	

Non-native Speakers (N=21)

Plugs	Obtained Percentage	32%	$z = .12$ n.s.
	Random Percentage	33%	
Holes	Obtained Percentage	49%	$z = 1.82$ n.s.
	Random Percentage	33%	$(.05 < p < .10)$

Table 2
Comparing Obtained Percentages to Random-Chance Percentages

The basic comparisons of interest are those between Total-plug performances and Total-hole performances within each group of subjects. See Table 3.

Native Speakers (N=23)

Total Plugs	27%	$z = 3.91$ $p < .01$
Total Holes	60%	

Non-native Speakers (N=21)

Total Plugs	32%	$z = 1.94$ n.s.
Total Holes	49%	$(.05 < p < .10)$

Table 3
Comparing Total Plugs and Holes Within Each Group

Again, by using the test of significant differences in proportions, we find the native speaker group performing statistically significantly better on the hole items than on the plug items. For the non-native group, the better performance on the hole items is not statistically significantly better than on the plug items, although it does approach statistical significance; the results for both types of items are too close to chance, random results to differ significantly.

Our last comparison is between the two groups on total plugs

and total holes.

Plugs

Native	27%	z = .63 n.s.
Non-native	32%	

Holes

Native	60%	z = 1.27 n.s.
Non-native	49%	

Table 4
Comparing Plugs & Holes Across Groups

Again, via the test of significant differences in proportions, we find no significant differences between the two groups in their performance on the plug items or in their performance on the hole items. Non-native speakers of English perform comparable to native speakers of English in their interpretations of the necessary presuppositions of holes and plugs.

Since there were three multiple choice responses of which only (a), for the hole items, and (c), for the plug items, were correct answers, it was important to see which response subjects generally chose. More precisely, it was essential to find out whether (b) was as frequent a response as the two other choices, which could have indicated that the subjects did, in fact, use a chance guessing strategy. The figures included in Table 5 seem to rule out this possibility. (Since there were no significant differences in performance between the two groups of subjects, the results of the item means and response values are given for both groups combined.)

Table 5 presents the most revealing result of the entire study. For both the plug and the hole items, the distribution of response choices is the same. For both holes and plugs, subjects chose (a) more frequently than they did either the predicted response (c) or the third

alternative (b). Plugs behaved as though they were holes; the (a) response choice predicted of holes was by far the most frequently chosen alternative for plugs. The data in Table 5--the overwhelming preferences for (a) responses to both plugs and holes items--clearly indicate that both groups of subjects, regardless of the type of verb contained in the higher clause, generally felt that the speaker of the utterances necessarily committed himself to the truth of the complement sentence. The judgments subjects made about the sentences demonstrate that they perceived both types of verbs as if they were holes.

The results obtained in this experiment do not support Karttunen's hypothesis that certain verbs "plug" the presuppositions of their complement clause, whereas other verbs function as holes. Our findings suggest that sentences containing both types of verbs are treated by native and non-native English speaking judges as though they were all holes. Some possible ways of interpreting the results are discussed in the following section.

				Responses		
Type	Verb	Polarity	Item Mean	(a)	(b)	(c)
Plug	Promise	Affirm	0.36	27	1	16*
		Neg - 1	0.32	27	3	14*
		Neg - 2	0.20	32	3	9*
Hole	Possible	Affirm	0.59	26*	2	16
		Neg - 1	0.52	23*	7	14
		Neg - 2	0.52	23*	2	19
			Sum	158	18	88

N = 44 subjects (23 Natives, 21 Non-natives)
* indicates predicted response

Table 5
Item Means and Number of All Subjects Choosing (a), (b), (c)

DISCUSSION

The outcome of this investigation of Karttunen's theoretical

distinction between plugs and holes is rather surprising. The reader is reminded at this point that--although these results suggest the contrary--sentences containing a verb of saying or "performative" as their higher verb are inherently different from sentences containing holes. The speaker of a sentence employing a hole is not reporting what someone else said, believed, thought, disliked, etc., but makes a statement about some state-of-affairs. Verbs of saying, on the other hand, can be used by the speaker to report what illocutionary act has been performed by some other person. Thus, it should seem reasonable to conclude with Karttunen that since the speaker is only reporting, he does not necessarily have to commit himself to the truth of the propositional content of his reports. However, the obtained measures for this study showed that the subjects did not make the hypothesized distinction between plugs and holes in their judgments of sentences concerning the necessary speaker-beliefs.

Some of the work presently being done in the area of discourse analysis may offer an explanation of the results of this study. Prince (1978), arguing against Karttunen's system of holes, plugs, and filters, suggests that an analysis of presupposition has to be carried out on the level of discourse. Presuppositions, she maintains, do not get plugged or filtered. There are only potential sentence-presuppositions which correspond to stated assumptions and which become realized under certain conditions only on the discourse level. The hearer follows certain strategies for drawing inferences about to whom a given stated assumption is to be attributed. The hearer will attribute a given stated assumption to the speaker unless he receives explicit cues from the speaker (i.e. linguistic markers, such as words and phrases like SO-CALLED, PURPORTED, PUTATIVE FACT, etc.) not to attribute such assumptions to the speaker.

Prince's observations may have certain implications with respect to the interpretation of the results of this study, if we make the reasonable assumption that the position of a reader is similar to the position of a hearer. The subjects in our study read isolated sentences, sentences in a null linguistic context. They were told to imagine a speaker X uttering each of the sentences. Speaker X, in uttering the sentences, did

not indicate in any way that the underlying assumptions of his reports should not be attributed to him. Following Prince's suggestions, it therefore seems plausible that the subjects would conclude that speaker X must share the underlying assumptions of his reports on illocutionary acts. Hutchinson suggests that if the addressee does not hold counter-beliefs about the underlying propositions of the speaker's utterances, he is inclined to "swallow" the presupposition and come to believe it on the basis of his respect for the "expertise" of the speaker. (1971:137). In this study, subjects had no prior beliefs about the presupposed information contained in the speaker's utterances and the speaker did not explicitly disclaim the underlying assumptions. Thus, Prince's and Hutchinson's observations may help explain the frequent occurrence of the (a) response for plug items.

Fillmore (1971) makes several interesting observations concerning some verbs of judging. Contrary to Karttunen, who classifies CRITICIZE as plug, Fillmore maintains that sentences containing CRITICIZE as their higher verb presuppose that the defendant is reponsible for the situation. He further notes for sentences with CRITICIZE that the speaker, in making a statement addressed to someone and in choosing the verb CRITICIZE to report on some state-of-affairs, could actually be making the moral judgment himself. In other words, it may be the speaker, not the grammatical subject (=the judge, according to Fillmore), performing the act of judging. These observations can be extended to PROMISE as well. Thus, in our questionnaire, sentence #2–: MARY PROMISED JULIE TO INTRODUCE HER TO SUE'S DAUGHTER with grammatical subject MARY may have been quite neutral with respect to Mary's making a promise; speaker X may have chosen PROMISE when reporting Mary's utterance, thereby indicating that he interpreted Mary's act as a promise. Thus, in cases involving plug items, our subjects may well have given the DE RE interpretation to the sentence, concluding that since speaker X had chosen to use a particular verb to report the situation, he had to believe in the truth of the underlying propositions.

The possible explanations outlined above are intended only as tentative suggestions, directions in which to proceed for further investi-

gation of the phenomenon revealed in this study. More empirical research needs to be done to make any stronger claims. Nevertheless, the results of this study indicate that Karttunen's theoretical linguistic distinction between plugs and holes may be more complex than the simple distinction he proposed.

FOOTNOTES

[1]Since this study does not include any filters, we will mention only briefly Karttunen's class of filters. Filters--the logical connectives IF...THEN, AND, and EITHER...OR--are usually, according to Karttunen, holes. However, under certain conditions, they function as plugs. A complex sentence of this type consisting of the clauses S_1 and S_2 presupposes everything that is presupposed by each of the conjuncts, unless S_2 presupposes a propositional content that S_1 entails.

[2]Unfortunately, the class of filters could not be included in this study since sentences containing filters are too different to fit the pattern of sentences containing plugs or holes. We hope to test this class in future experiments.

[3]The sentences involved three different types of complement structures depending on the kind of verb in the higher clause: THAT– complementizer, (FOR–) TO– complementizer.

[4]Since negations and double negations were involved, the responses were kept in that same (a), (b), (c) order for all sentences; it was felt that varying the order of choices would have unnecessarily confused the subjects.

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APPENDIX

Name:

Below are several sentences, each one followed by a set of multiple choice responses. Please judge what the speaker must NECESSARILY believe when uttering the sentences. Keep in mind that it is not you who is uttering the sentences, but that some speaker X is saying each sentence. Assume that the sentence said by speaker X is all you know and that the speaker is not lying. Your beliefs may or may not be the same as the speaker's; in fact, the speaker's beliefs may be contrary

to what you know about the real world. Picture yourself as the hearer and judge FROM THE SENTENCE what speaker X must NECESSARILY believe (not what he probably believes) when saying the sentence as a sincere utterance.

EXAMPLE:

Speaker X: "Bill SAID that Jack's children are bald."

(a) The speaker of this sentence must NECESSARILY believe that Jack has children.

(b) The speaker of this sentence must NECESSARILY believe Jack does not have children.

(c) The speaker of this sentence does not NECESSARILY have to believe that Jack has children.

The answer for this particular sentence is (c), since speaker X may be reporting what Bill said without NECESSARILY having to believe that Jack has children.

Mark your choice for each sentence by circling (a), (b), or (c).

1. Speaker X: "It is POSSIBLE that Randy's talking plant didn't get kidnapped."

   (a) The speaker of this sentence must NECESSARILY believe that there exists a talking plant.

   (b) The speaker of this sentence must NECESSARILY believe that there does not exist a talking plant.

   (c) The speaker of this sentence does not NECESSARILY have to believe that there exists a talking plant.

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2. Speaker X: "Mary PROMISED Julie to introduce her to Sue's

daughter."

(a) The speaker of this sentence must NECESSARILY believe that Sue has a daughter.

(b) The speaker of this sentence must NECESSARILY believe that Sue does not have a daughter.

(c) The speaker of this sentence does not NECESSARILY have to believe that Sue has a daughter.

3. Speaker X: "It isn't POSSIBLE that the pink elephant living in the Cincinnati zoo has lost an ear."

(a) The speaker of this sentence must NECESSARILY believe that there exists a pink elephant.

(b) The speaker of this sentence must NECESSARILY believe that there does not exist a pink elephant.

(c) The speaker of this sentence does not NECESSARILY have to believe that there exists a pink elephant.

4. Speaker X: "Marita did not PROMISE her father to bring her boyfriend over for dinner."

(a) The speaker of this sentence must NECESSARILY believe that Marita has a boyfriend.

(b) The speaker of this sentence must NECESSARILY believe that Marita does not have a boyfriend.

(c) The speaker of this sentence does not NECESSARILY have to believe that Marita has a boyfriend.

5. Speaker X: "It is POSSIBLE that the present King of France took a plane to Germany last week."

(a) The speaker of this sentence must NECESSARILY believe that there exists a present King of France.

(b) The speaker of this sentence must NECESSARILY believe that there does not exist a present King of France.

(c) The speaker of this sentence does not NECESSARILY have to believe that there exists a present King of France.

6. Speaker X: "Sam PROMISED Linda not to overfeed her dog."

(a) The speaker of this sentence must NECESSARILY believe that Linda has a dog.

(b) The speaker of this sentence must NECESSARILY believe that Linda does not have a dog.

(c) The speaker of this sentence does not NECESSARILY have to believe that Linda has a dog.